Harrison indicated to the Task Force that wastewater treatment sludge has, since 1969, been disposed of at the Niagara County Refuse Disposal District site in Lockport. In 1978, Harrison indicated to DEC that it was generating 4.5 million gallons per year of wastewater treatment sludge and that this sludge was being stored in lagoons on premises until the question of its final disposal was resolved. Internal Harrison Radiator documents made available to the Task Force indicate that in 1974, it was generating 19,413 tons of sludge and disposing of this sludge in a "municipal" landfill.

Waste oils (196,150 gallons/yr.), chlorinated solvent waste (39,300 gallons/yr.) and polyester resin (660 gallons/yr.) have been hauled from Harrison Radiator by Frontier Chemical for blending into fuels.

Paint sludges (67,600 gallons/yr. in 1977) have been hauled by Frontier Chemical to Newco Waste Systems for disposal.

Fly ash (375 tons/yr. in 1974) has been hauled from the plant by the New York State Department of Transportation for use on icy roads.

Mercury (50 pounds/yr. in 1974) has also been hauled from the plant by Hoover E. Strong of 119 West Pepper Street in Buffalo.

HOOKER CHEMICALS AND PLASTICS CORPORATION
Buffalo Avenue, Niagara Falls
Walck Avenue, North Tonawanda
Long Road, Grand Island

Hooker Chemicals and Plastics Corporation was founded in 1906 as the Development and Funding Company. It has since been known as Hooker Electrochemical Company (1909 to 1958), Hooker Chemical Corporation (1958 to 1974) and Hooker Chemicals and Plastics Corporation (since 1974). Hooker is a subsidiary of the Occidental Petroleum Company.

Hooker acquired three firms during the 1950s. In 1955, Durez Plastics and Chemicals, North Tonawanda, and Niagara Alkali Chemical Company, Niagara Falls, were acquired. Oldbury Electrochemical Company, Niagara Falls, was acquired in 1956.

I. Buffalo Avenue Plant

The Buffalo Avenue plant produces a wide variety of inorganic and organic compounds. Over 250 chemicals, many with numerous variations, have been produced since 1930. The major products

are chlorine, caustic soda, chlorotoluenes, dechlorane plus, halogenated organics such as parachlorobenzotrichloride (PCBTC) and parachlorobenzotrifluoride (PCBTF) and various sulfur and phosphorus compounds.

A large number of organic compounds made at the Buffalo Avenue plant are no longer produced. Mirex (dechlorane) was actively produced until 1967 although grinding and packaging operations continued until 1975. For a very short time, Hooker also produced pilot scale quantities of kepone, a compound very similar in structure to mirex.

Both mirex and kepone are also derivatives of hexachlorocyclopentadiene (C-56). Hooker produced C-56 itself on-site from 1949 to 1975. Other derivatives of C-56 which Hooker produced in the past include thiodan (endosulfan) (1958 to 1975), a major pesticide product, dechlorane 602 and 604, fire retardant chemicals and chlorendic acid, also a fire retardant chemical.

In the past Hooker also produced trichlorobenzene and tetrachlorobenzene by the chlorination of benzene. At least one isomer of trichlorobenzene, the 1,2,4 isomer, is regarded as a pesticide.

From 1946 to 1975, Hooker also produced major quanitites of hexachlorocyclohexane (C-66) by the chlorination of cyclohexane. The gamma isomer of C-66 was marketed under the trade name Lindane. A mixture of all four known isomers was marketed under the trade name Isotox.

Until approximately 1971, Hooker produced major quantities of trichloroethylene on-site by the chlorination of acetylene.

Organo-phosphorous pesticides were produced until approximately 1971. Trichlorophenol was produced from 1949 to 1972. These operations used large quantities of phenolic compounds. A major contaminant in the production of trichlorophenol is TCDD, a highly toxic dioxin.

In 1943, Hooker also conducted an operation for the slag recovery of uranium bearing materials as the precursor to uranium recovery. This operation took place on a part of the Hooker facility adjacent to the New York Central Railroad.

From 1951 to 1953, Hooker operated the Niagara Falls Army Chemical Plant on Buffalo Avenue in Niagara Falls. The plant produced clothing impregnate (with chlorinated phenyl urea). From 1954 to 1958, Hooker operated a boron isotope separation plant at the Lake Ontario Ordinance Works.

Numerous production processes have been used since 1930 at the Buffalo Avenue Plant. These are generally the standards unit operations and processes commonly used by the chemical process industries. Typical processes include diaphrahm and mercury

chlorine cells (since 1930), chlorate cells (since 1930), nitrations (since 1930), sulfonation (since 1930), hydrofluorinations and fluorinations (since 1945), esterification/polymerization (since 1973), transesterifications (1960 to 1970), diels-alder condensations/dimerization of hexachlorocyclopentadiene (C-56) (since 1953) and chlorinations, hydrochlorination and dehydrochlorinations of organic materials (since 1930).

The Buffalo Avenue plant has generated the following types of industrial wastes:

1. Benzychlorides (includes benzal chloride, benzyl alcohol and benzyl thiocyanate (1930 to 1967)
2. Thiodan (Endosulfan) 1958 to 1975)
3. Sodium sulfides/sulfhydrates (1939 to 1975)
4. Hexachlorocyclopentadiene (C-56) (1949 to 1975)
5. Hexachlorocyclohexane (Lindane/BHC/HGI) (1946 to 1975)
6. Chlorobenzenes (1930 to 1974)
7. Benzoyl chlorides (1930 to 1975 and benzotrichlorides (1930 to 1967)
8. Benzotrichlories (1968 to 1975)
9. Liquid disulfides (LDS/LDSN/BDS) and chlorotoluenes (1930 to 1967)
10. HCl purification and chlorotoluenes (1967 to 1975)
11. Metal chlorides (1930 to 1967)
12. Benzotrifluorides (organic residues) (1960 to 1975)
13. Calcium fluorides (from benzotrifluorides (1973 to 1975)
14. Benzotrifluoride derivatives (1965 to 1975)
15. Dodecyl (Lauryl, Lorol), mercaptans (DDM), chlorides and miscellaneous organic sulfur compounds (1940 to 1975)
16. Trichlorophenol (TCP) (1949 to 1972)
17. Thionyl choride and miscellaneous sulfur/chloride compounds (1930 to 1975)
18. HET acid, anhydride and HETRONS (1953 to 1975)
19. Miscellaneous chlorination (includes waxes, oils, naphthalenes and aniline)
20. Miscellaneous acid chlorides other than benzoyl (includes acetyl, caprylyl, butyryl and nitro benzoyls)
21. Dechlorane (Mirex)
22. C-56 Derivatives (includes Dechlorane Plus, Dechlorane 602, Dechlorane 604 and Pentac)
23. Phenol tars containing chlorobenzenes (from Durez)
24. Organic phosphorus compounds (including phosphites, phosphonates, acid phosphates and thiophosphates)
25. Phosphorus and inorganic phosphorus derivatives other than sodium hypophosphite (includes chlorides and sulfides)
26. Sodium hypophosphite
27. Brine sludge from the mercury abatement process
28. Miscellaneous waste materials including:

a. Off-grade process material
b. Pilot plant and semi-commercial wastes
c. Transformer oils and cleaning solvents
d. Byproducts from defense projects during World War II.

The plant also generated fly ash, gypsum, slag, cell components, brine sludge (except from mercury abatement), construction debris and general plant refuse.

The uranium slag recovery operation generated radioactivity, which, in 1976, the federal government found to be at levels within federal and state standards for unrestricted use. The operation of the Niagara Falls Army Chemical Plant generated inorganic acid wastes, organic distillation residues, floor sweepings, filter cloth, trichloraniline, hydrochloride still and zinc oxide. Neither Hooker nor the federal government indicated the nature of wastes generated at the boron isotope plant and where such wastes were disposed of.

Many disposal sites were used for the disposal of industrial wastes. These sites are described below. The number following the type of waste refers to the 28 classes of waste identified above. The figures for total quantity of waste deposited at each site were derived by Hooker from past disposal records, production figures and residue factors and statements by current and former employees. These figures do not have a high degree of accuracy. However, they do give an indication of the magnitude of waste quanities disposed of at each site.

A. Company owned sites

1. Love Canal (97th to 99th Streets, Niagara Falls)

Hooker used the Love Canal as a disposal area for industrial wastes from approximately 1942 to 1952. Hooker purchased the 16 acre Love Canal parcel in 1947 from Niagara Power and Development Company but used the site for the five years prior to purchase pursuant to a written letter agreement with Niagara Power and Development Company. In 1953, Hooker sold the Love Canal site to the Niagara Falls Board of Education. The types of industrial wastes disposed of by Hooker at Love Canal are listed below:

Type of Waste	Estimated Total Tonnage
Misc. acid chlorides (20)	400 tons
Thionyl choride (17)	500 tons
Misc. chlorinations (19)	1,000 tons
DDM (15)	2,400 tons
TCP (16)	200 tons

Benzoyl chloride (7)	800 tons
Metal chlorides (11)	400 tons
LDS/MCT (9)	700 tons
BHC (5)	6,900 tons
Chlorobenzenes (6)	2,000 tons
Benzyl chlorides (1)	2,400 tons
Sulfides (3)	2,100 tons
Misc. 10% of above	2,000 tons
Total	21,800 tons

Wastes brought to the Love Canal were transported and dumped as liquids, solids or semi-solids in metal or fibre drums. Records indicate that material was placed in that site in drums and emptied into the Canal from the drums. The drums were later transported from the site or placed in the Canal empty of wastes. In addition, the Task Force learned that bulk quantities of liquid and solid industrial wastes were deposited directly into the Canal.

Haulers used to transport wastes for disposal at Love Canal were Hooker Electrochemical Company, Carl Wagner Trucking of Niagara Falls, Young's Trucking and a firm called Lasher with which a Mr. McArdle was associated. The Lasher firm is apparently no longer in existence.

Records indicate that all industrial wastes deposited by Hooker at the Love Canal were generated by its original Niagara Falls facility and did not come from Niagara Alkali Chemical Company, Oldbury Electrochemical Company or Durez Plastics and Chemicals, Inc., which at that time were not part of Hooker. Furthermore, the Task Force has not been able to identify any other entities, except the City of Niagara Falls, that disposed of wastes at the Canal. The Army indicated to the Task Force that Hooker contracted with Carl Wagner to haul wastes from the Niagara Falls Army Chemical Plant to a Hooker owned site. These wastes were, in all likelihood, disposed of at the Love Canal since (a) Love Canal was in use when Hooker was operating the Army Chemical plant; (b) waste type 19 including chloroanilines that could have been generated at the Army Chemical Plant was disposed of at the Love Canal and (c) Carl Wagner Trucking hauled Hooker wastes to Love Canal.

2. Hyde Park (Hyde Park Boulevard, Town of Niagara)

Hooker acquired the Hyde Park site and used it as a disposal site for industrial wastes after the closing of Love Canal in 1953 to August 1975. The site comprises approximately 15 acres. Hooker still owns the site today.

Hooker disposed of the following types of industrial wastes at Hyde Park:

Type of Waste	Estimated Total Tonnage
Calcium fluoride (13)	400 tons
Mercury brine sludge (27)	100 tons
C-56 derivatives (22)	4,500 tons
Organic phosphates (24)	4,400 tons
Hypo mud (26)	1,000 tons
Inorganic phosphates (25)	100 tons
Misc. acid chlorides (20)	1,200 tons
Dechlorane (21)	200 tons
BTC (8)	1,700 tons
Chlorotoluenes (10)	1,700 tons
HET acid (18)	2,100 tons
Misc. chlorinations (14)	1,600 tons
BTF derivatives (14)	2,900 tons
DDM (15)	4,500 tons
TCP (16)	3,300 tons
BTF (12)	5,600 tons
Benzoyl chloride (7)	6,200 tons
LDS/MCT (9)	900 tons
Metal chlorides (11)	100 tons
C-56 (4)	1,100 tons
BHC (5)	2,000 tons
Chlorobenzenes (6)	16,500 tons
Benzyl chloride (1)	3,400 tons
Thiodan (2)	1,000 tons
Sulfides (3)	6,600 tons
Misc. 10% of above	7,300 tons
Total	80,200 tons

In addition, when Frontier Avenue was relocated to make room for the LaSalle Expressway in 1968, approximately 200 cubic yards of soil and wastes from the lower section of Love Canal were excavated and transported to Hyde Park for disposal.

Wastes brought to Hyde Park were land disposed generally in pits and were transported and dumped as liquids, solids or semi-solids. Material was placed in the site in drums, emptied from drums which were then returned to the plant or dumped directly into the site as bulk liquids or solids. Some of the liquid waste was mixed with fly ash prior to final disposal. In addition, plant rubbish was also disposed of at the Hyde Park site.

Hooker, Carl Wagner Trucking, Walter S. Kozdranski Co., Inc. of Niagara Falls and J. Vitullo Trucking, also of Niagara Falls, tranported wastes to Hyde Park. There is no indication that Hooker allowed other firms or municipalities to use the Hyde Park site for waste dipsosal.

3. 102nd Street (Buffalo Avenue, Niagara Falls)

Hooker used the 102nd Street site to dispose of industrial wastes from prior to 1943 until approximately 1971. They still own the site today. The site is approximately 20 acres in size and is comprised of two parcels which were owned by Oldbury Electrochemical, one parcel owned by Niagara Alkali, and one parcel owned by Hooker. In addition, this site is bordered on the west by Griffon Park and on the east by a dump site owned by the Olin Corporation. The following types of industrial waste disposed of at this site:

Type of Waste	Estimated Total Tonnage
Organic phosphites (24)	100 tons
Sodium hypophosphite (26)	20,000 tons
Inorganic phosphates (25)	900 tons
BHC cake (including Lindane) (5)	300 tons
Chlorobenzenes (6)	100 tons
Misc. 10% including other chlorinated organics	2,100 tons
Total	23,500 tons

Cell parts and equipment, brine sludge, fly ash and garbage were also dumped at this site.

Wastes were dumped in bulk or in drums as solids, semi-solids or liquids. A Hooker document indicates that the Hooker parcel of the 102nd Street site was used prior to the Love Canal for the disposal of solid and drummed residues. Among the wastes dumped were benzoyl chloride, thionyl chloride, chlorinated waxes, polychlorinated napthalenes, hydrochloric acid, antimony chloride, benzoic acid, benzoate of soda and caprylyl chloride. Hooker, however, maintains that this site was not used prior to Love Canal. Furthermore, no firms, other than Hooker and its affiliates, used this site for waste disposal.

4. River Site (S and N Areas) (Buffalo Avenue, Niagara Falls)

This site is located on the Niagara Falls plant west of the Niagara Falls water treatment plant and north of the Robert Moses Parkway. The size of the site is approximately 16 acres. Hooker used this site for industrial waste disposal from approximately 1947 to 1975. Major disposal operations were phased out about 1961 although disposal of sulfur/chlorine residues (waste class 17) continued up to about 1967 and equipment cleaning operations continued up to 1975.

Hooker disposed of the following types of wastes at the River site:

Type of Waste	Estimated Total Tonnage
Organic phosphates (24)	200 tons
Misc. acid chlorides (20)	400 tons
Phenol tars (23)	800 tons
Thionyl chloride (17)	4,200 tons
HET acid (18)	500 tons
Misc. chlorinations (19)	400 tons
DDM (15)	8,100 tons
TCP (16)	200 tons
Benzoyl chloride (7)	3,300 tons
LDS/MCT (9)	2,200 tons
Metal chlorides (11)	900 tons
C-56 (4)	17,400 tons
Chlorobenzenes (6)	18,900 tons
Benzyl chlorides (1)	1,600 tons
Thiodan (2)	700 tons
Sulfides (3)	4,200 tons
Misc. 10% of above	6,400 tons
Total	74,400 tons

Hooker documents also indicate that benzene hexachloride and Lindane filter cake were disposed of in the N Area.

The River Site was used for disposal of slag, fly ash and gypsum and was also a staging area for drums destined for disposal at Love Canal. The phenol tars containing chlorinated benzenes disposed of at this site were generated at the Durez facility. The site was apparently not used by companies other than Hooker.

Disposal practices of the River Site included bulk dumping of liquids, solids and semi-solids. Trenches were dug and material was placed directly in them or placed in the trenches in drums. Hooker documents also indicate that tank cars were buried in this site.

No waste haulers were used other than Hooker and its affiliates. However, the site was filled sometime after 1938 when it was still under the Niagara River.

5. Miscellaneous On-Plant Disposal Sites (Buffalo Avenue, Niagara Falls)

a. D Area

The D Area was used as a disposal site by Hooker from approximately 1930 to 1942. Hooker documents indicate that there may have been two disposal sites in the D Area.

Wastes were dumped as liquids, solids or semi-solids, in bulk or drummed quantities. The types of industrial waste disposed of at this site are listed below:

Type of Waste	Estimated Total Tonnage
Misc. acid chlorides (20)	200 tons
Thionyl chloride (17)	400 tons
Misc. Chlorinations (19)	500 tons
Benzoyl chlorides (7)	800 tons
LDS/MCT (9)	800 tons
Metal chlorides (11)	100 tons
Benzyl chloride (1)	800 tons
Sulfides (3)	200 tons
Misc. 10% of above	400 tons
Total	4,200 tons

Hooker and its affiliates were the only haulers to transport waste to this site and apparently other firms did not use this site.

b. F Area

The F Area was used as a disposal site from approximately 1930 to 1946. Again, wastes were dumped as liquids, solids or semi-solids, in bulk or drummed quantity. The wastes disposed of at this site are listed below:

Type of Waste	Estimated Total Tonnage
DDM (15)	100 tons
Chlorobenzenes (6)	1,400 tons
Total	1,500 tons

Some of the chlorobenzene material was excavated and moved to the River Site (S and N areas). Waste contractors were not required for disposal at this site and apparently other companies did not dispose of wastes at this site.

c. V Area

Three sites were used for disposal in the V area: V-56, V-64 and V-80. V-56 was first used in 1930. It is not known when use of this site was discontinued. There is little information on the period of use of the V-64 site. Apparently this site was used as a ground level dewatering area. The V-80 site was used from 1968 to May 1978.

Wastes disposed of at these sites were dumped as liquids, solids or semi-liquids, in bulk or drum quantity. The method of disposal is not clear from Hooker documents, but is believed to include pits and ground level dumping. Haulers other than Hooker and its affiliates were not needed to transport wastes to these sites.

The types of industrial waste disposed of at the V area sites are listed below:

(1) V-80

Type of Waste	Estimated Total Tonnage
Phosphorus pentachloride	250 tons
Phosphorus trichloride	25 tons
Phosphorus pentasulfide	
Scrap phosphorus	
THPC	
THPS	
Benzoyl peroxide	
Aluminum phosphide	
Carbon disulfate	
Hepta sulfide	
Phosphoric acid	
Total	400 tons

(2) V-56

Type of Waste	Estimated Total Tonnage
Phosphorus liquid and solid	200 tons
Total	200 tons

d. U Area

Niagara Alkali operated two settling basins in this area for dewatering brine sludge. The years of operation of this site are not known. This sludge was removed periodically. Hooker documents indicate that this waste was disposed of at the 102nd Street site. Hooker documents also indicate that this area may contain some caustic, trichloroethylene and asbestos. However, the nature and quantity of these materials are not known.

e. Fine Chemicals Waste Lagoon

This site is located in the area where buildings D-11 and D-21 are now located. Very little information is known about this site, but it was apparently used during the 1930s and 1940s. Hooker documents indicate that liquid benzoyl chloride and other liquid residues were disposed of in these lagoons. However, the quantities and composition of these wastes are not known.

f. W-107

This site was apparently used as a ground level dewatering area. However, the years of operation of this site and the nature and quantity of wastes is not known.

B. On-Site Waste Treatment

1. Residue Reactor (Incinerator)

A patented residue reactor (incinerator) system for the destruction of bulk liquid organic residues was started up in late 1961 in Area 3 of the Niagara Falls plant. It is still operating today. Wastes from Hooker's Montague, Michigan C-56 operation were destroyed in the residue reactor from 1963 to 1972. The quantity of this waste is estimated to be about 900 tons and was included in the figure for waste class (4) below. The types and quantity of wastes disposed of at this facility from 1961 to 1975 are listed below:

Type of Waste	Estimated Total Tonnage
BTCs (8)	9,300 tons
Chlorotoluenes (10)	25,200 tons
HET acid (18)	3,400 tons
Benzoyl chloride (7)	23,400 tons
C-56 (4)	28,100 tons
Chlorobenzenes (6)	43,400 tons
Thiodan (2)	23,100 tons
Misc. 10% of above	15,600 tons
Total	171,500 tons

Hooker has recently received a DEC permit to incinerate the following types of industrial waste in its residue reactor:

Benzal chlorides
Benzoic acid
Benzoic anhydride
Benzotrichloride
Benzoyl trichloride
Benzyl chlorides
Chlorobenzotrichloride
Chlorotoluenes
Dechlorane plus
Dichlorobenzotrichloride
Perchloroethylene
Toluene
Formaldehyde
Hexachlorocyclopentadiene
Hexachloropentadiene
High boilers
Methanol
Monochlorotoluene
Orthochlorotoluene
Parachlorobenzoyl chloride
Parachlorotoluene
Pentac
Tetrachlorothiathrene
Trichlorotoluene
Water and water contaminated with lubricating oil

Hooker has indicated that no wastes were land disposed at the site of the residue reactor.

2. Other Treatment

An incinerator near the existing boiler house was used during the late 1940s to destroy sulfur containing wastes. However, Hooker has indicated that records of the composition and

quantity of wastes disposed and a description or operation of this unit have not been found.

Two ponds are currently in use in the S area. These ponds are used for the neutralization of hydrofluoric acid with lime. The resulting calcium fluoride sludge is being landfilled at Newco Waste Systems.

No separate recovery units, other than those within individual processes are operated at the Niagara Falls plant.

Finally, several refuse incinerators have been used at the Buffalo Avenue plant.

C. Off-Plant Waste Disposal Sites

1. Chem-Trol (Blasdell)

The Chem-Trol site in Blasdell was used by Hooker in 1971 for the disposal of an estimated 200 tons of bulk liquid hexachlorocyclopentadiene (C-56) and less than 100 tons of miscellaneous industrial wastes. Chem-Trol was contracted by Hooker to haul the above wastes to the Blasdell site.

2. SCA (Chem-Trol) (Porter)

Hooker used Chem-Trol to dispose of a substantial quantity of industrial waste from 1972 to 1975. The material was hauled by Hooker and Chem-Trol and included liquid, solid and semi-solid wastes in bulk or drummed quantities. The industrial wastes disposed of at Chem-Trol during the period 1972 to 1975 are listed below:

Type of Waste	Estimated Total Tonnage
Calcium fluoride (13)	100 tons
Mercury brine sludge (27)	2,800 tons
C-56 derivatives (22)	2,000 tons
BTC (8)	300 tons
Chlorotoluenes (10)	200 tons
HET Acid (18)	100 tons
BTF derivatives (14)	1,200 tons
DDM (15)	500 tons
TCP (16)	100 tons
BTF (12)	5,100 tons
Benzoyl chlorides (7)	700 tons
C-56 (4)	300 tons
BHC (5)	200 tons
Chlorobenzenes (6)	100 tons
Thiodan (2)	100 tons
Sulfides (3)	100 tons
Misc. 10% of above	1,300 tons
Total	14,600 tons

The quantity of waste material disposed of at Chem-Trol has been substantially reduced since 1976 because of the start-up and operation of Newco Waste Systems in Niagara Falls. However, in 1976 approximately 9,000 tons of wastewater containing sulfuric acid and heavy metals, and about 700 tons of mercury sludge were disposed of at Chem-Trol. In 1977 approximately 1,000 tons of mercury sludge was sent to Chem-Trol for disposal.

3. Newco Waste Systems

Since Newco began operations in August 1976, it has been Hooker's major off-premises disposal site for industrial waste. Hooker transports most of the waste to Newco including bulk or drummed quantities of liquids, solids and semi-solids. The total quantity of industrial waste disposed of at Newco is estimated to be over 2,500 tons. The waste types are similar to those previously disposed of at Chem-Trol.

In addition, Hooker has contracted with Tricil Waste Management Limited of Mississauga, Ontario through Newco to dispose of liquid chlorinated organics and wastewaters which Newco is unable to handle.

4. Niagara Recycling (Niagara Falls)

Niagara Recycling is part of the Newco conglomerate. Hooker has used Niagara Recycling since 1974 to dispose of about 10,000 tons of sodium hypophosphite and over 100,000 tons of calcium fluoride sludge. Wizard Methods of Niagara Falls hauls the calcium fluoride sludge to Niagara Recycling. Niagara Sanitation and Niagara Recycling have transported the sodium hypophosphite mud. Both of these wastes are transported in bulk containers. Fly ash has also been disposed of at this site.

5. Niagara County Refuse District (Witmer Road, Wheatfield)

Hooker used this site from 1970 to 1972 to dispose of bulk quantities of sodium hypophospite mud. An estimated 5,700 tons of the material was transported to this site for Hooker by Niagara Sanitation.

6. Robert Moses Parkway (Niagara Falls)

This site is located on property owned by PASNY, approximately 200 yards west of the intake structures, between the Robert Moses Parkway and the Niagara River. Its location was identified to a member of the Task Force by a private citizen who was involved in PASNY's major construction projects in Niagara Falls in the late 1950s and early 1960s. This person indicated that this site was used as a "one-shot" disposal site for approximately 200 to 300 drums of unknown chemical wastes from Hooker in or about 1963. Hooker has not confirmed the existence of this disposal site.

7. Silbergeld Junk Yard (14th Street, Niagara Falls)

Scrap metals from Hooker and Oldbury Electrochemical was disposed of at this site from the mid-1930s to mid-1950s. Hooker maintains that none of this scrap contained any chemical waste.

8. Miscellaneous Out-of-State Facilities

Ohio Liquid Disposal, Freemont, Ohio, has recently been used to dispose of several hundred thousand gallons of sulfuric acid, hexachlorocyclopentadiene and several million gallons of leachate from Hooker's Hyde Park landfill. Ohio Liquid Disposal transports this material to Ohio for deep well disposal. In addition, Rollins Environmental Services, Bridgeport, New Jersey, has been used occasionally to dispose of a few tons of pentac contaminated clothing.

II. North Tonawanda Plant - Durez Division

The Durez Division plant has produced a wide variety of products since 1930. The products and the years of production are listed below:

1. Penolic resin and pulverized phenolic resins (since 1930)
2. Phenolic, polyester, and diallylphthalate molding compound (since 1930)
3. Formaldehyde (since 1947)
4. Para-tertiary octyl phenol (since 1946)
5. Hexamethylenetetramine (since 1963)
6. Zinc stearate and calcium stearate wax (since 1947)
7. Phenol (1940 to 1971)
8. Recovered phenol (since 1941)
9. Polyester resin (1957 to 1975)
10. "Hetrofoam" (since 1960)

Numerous processes are used to produce these products. These processes are generally the standard unit operations and processes commonly used by the chemical process industry, including chemical reactions, oxidation, dehydration, chlorination, hydrolysis (discontinued in 1971), esterification, styrenation, mixing, rolling, grinding and screening.

The Durez Division has generated the following types of industrial waste:

1. Alkyl and diallylphthalate molding compound
2. Calcium aluminum oxide
3. Calcium phosphate
4. Caustic wastewater
5. Copper aluminum oxide
6. Epoxy resins

7. "Hetrofoam"
8. Hexamethylenetetramine
9. Off-specification or rejected product
10. Oil sludge
11. Other phenol bearing materials including liquid resins
12. Other phenol tar
13. Para-tertiary octyl phenol wash water
14. Phenol plant tars containing chlorinated benzenes
15. Phenolic molding compound
16. Phenolic resin
17. Polyester resin
18. Solvents (toluene, xylene and methanol)
19. Spent silver catalyst
20. Waste oil
21. Waxes (zinc stearate or calcium stearate)
22. Miscellaneous industrial wastes

The Durez Division has utilized the following sites for the treatment and disposal of industrial wastes:

A. Company-owned sites

Durez used 14 disposal sites on plant property between 1930 and 1973 to dispose of approximately 28,500 tons of industrial waste. In addition, rubbish (paper, cardboard, garbage) was also dumped at these sites. The types of wastes disposed of include drummed quantities of phenol tar (including a substantial amount containing chlorinated benzenes), phenol bearing material (including phenolic resins and molding compounds) and calcium aluminum oxide and calcium phosphate catalyst. These wastes were dumped without containers. A general description of the types of waste disposed of at each site follows. A specific description of each site is included in the section of this report on disposal sites.

Site	Waste Types
I	Phenol tar containing chlorinated benzenes
II	Phenol tar containing chlorinated benzenes; phenolic resins; rubbish
III	Calcium aluminum cxide and calcium phosphate
IV	Phenol tar containing chlorinated benzenes
V	Phenol bearing material
VI	Phenolic resins (liquid)
VII	Phenol bearing material (liquids and solids)
VIII	Phenol
IX	Calcium aluminum oxide and calcium phosphate
X	Phenolic bearing materials; rubbish
XI	Phenolic resins (liquid)
XII	Phenolic bearing materials; rubbish
XIII	Phenolic bearing materials; rubbish
XIV	Phenol bearing materials

Hooker land disposed the following quantities of waste at its Durez plant facility:

Type of Waste	Estimated Total Tonnage
Phenol tar	250 tons
Phenol bearing material	28,000 tons
Calcium aluminum oxide and calcium phosphate	250 tons
Total	28,500 tons

From 1957 to 1958, Durez hauled about 250 tons of liquid phenolic residue and 500 tons of liquid phenolic tars to the Hooker Niagara Falls plant for disposal. These materials were transported in drums. A Hooker document indicates that the phenol tars contain chlorinated benzenes. This material was disposed of in the S and N areas.

The distillate and vacuum pump seal water wastes generated since 1976 in the vacuum pump seal water systems in the "Hetrofoam" process has been disposed of in the residue reacter at Hooker's Niagara Falls plant.

B. Off-Plant Waste Disposal Sites

1. Pfohl Brothers

This site was used by Durez from 1969 to 1971. Schreck Iron and Metal Works of North Tonawanda was employed to haul approximately 125 tons of phenol tar to this site for disposal. A Hooker document indicates that the phenol tar contains chlorinated benzenes.

2. Chem-Trol Pollution Services (Porter)

Chem-Trol was contracted by Durez in 1975 to haul 14,800 gallons of caustic wastewater. This material transported in bulk quantities to Porter for disposal.

3. Huntley Power Station (Tonawanda)

Durez has indicated to the Task Force that, for a period of several years in the late 1950s, approximately 625 tons of phenol tar was transported to the Huntley Power Station in Tonawanda for use as fly ash cover material. The name of the waste hauler is not known. A Hooker document indicates that the phenol tar contains chlorinated benzenes. The Niagara Mohawk Power Corporation, owner of the Huntley Power Station, maintains that these phenol tars were disposed of at Gratwick Park in North Tonawanda and not the Huntley Power Station.

4. Interflow Systems, Ltd. (Hamilton, Ontario)

Interflow was used by Durez from 1974 to 1976 for the disposal of spent caustic wastewater and para-tertiary octyl phenol wash water. D&D Disposal of St. Catherines, Ontario, hauled bulk quantities of this material to Interflow. The quantities of such wastes are not known.

5. Ohio Liquid Disposal (Freemont, Ohio)

Ohio Liquid Disposal has been used since 1977 to dispose of approximately 85 tons of spent caustic wastewater. This material is transported in bulk quantities for deep well disposal in Ohio.

6. Tricil Limited (Mississaugua, Ontario)

Tricil was used in 1977 to haul bulk quantieis of para-tertiary octyl phenol to its site in Ontario. However, the quantity of such material is not known.

7. Holiday Park (Old Niagara Falls Boulevard and Walck Road, North Tonawanda)

Durez used this site from 1972 to 1974 to dispose of 125 tons of solid phenolic resin and 500 tons of solid phenolic molding compounds. These wastes were transported in drums. Also, Durez hauled about 500 tons of rubbish (paper, wood, metal and cardboard) to this site for disposal.

8. Newco Waste Systems (Niagara Falls)

Since 1977, Durez has disposed of 175 tons of solid phenolic resin, 113 tons of solid phenol, alkyd and diallylphthalate molding compound and 1.5 tons of oil sludge at Newco. In addition, an unknown quantity of solvents was also transported to Newco. Durez hauled the above materials in drum quantities. Furthermore, 3,500 tons of general rubbish (paper, wood, fiber drums, cardboard and garbage) have been taken to Newco since 1977 by Durez. In 1975 and 1976, Niagara Sanitation hauled about 6,500 tons of such material to that site.

9. Niagara County Refuse District (Witmer Road, Wheatfield)

Durez hauled drummed quantities of various industrial wastes to this site from 1968 to 1975. This includes approximately 20,000 tons of solid phenolic resins, about 20,000 tons of solid phenolic molding compound, and nearly 50 tons of oil and grease drippings. In addition, approximately 40,000 tons of rubbish (paper, wood and garbage) was also disposed of at this site.

10. Gratwick Park (River Road, North Tonawanda)

This site was used from 1960 to 1968. Durez hauled approximately 25,000 tons of solid phenolic resin, 25,000 tons of solid phenolic molding compound, nearly 50 tons of oil and grease drippings, 50,000 tons of rubbish (wood, paper and garbage) and an unknown quantity of solvents to this site.

11. Seaway Industrial Park (River Road, Tonawanda)

Durez used this site during the early 1970s to dispose of about 500 tons of rubbish (paper, wood and cardboard). This site was used on Saturdays when the municipal disposal sites identified above were closed. Durez has indicated that phenolic resins and molding compounds were not disposed of at this site.

C. Other Waste Disposal Practices

During the 1940s, phenol tar containing chlorinated benzenes was sold to a contractor and used as material for road surfacing. The name of the contractor is not known. In addition, some of this material was trucked to an unknown site in Lancaster and buried. At present, the effluent of the phenol recovery process is incinerated in an oil heated steam boiler, the effluent of the hexamethylenetetramine process is distilled to remove methanol and tar residue from the phenol recovery process is incincerated under experimental test conditions approved by DEC. Booth Oil of North Tonawanda has, since 1967, hauled approximately 30,000 gallons of waste oil from the Durez plant.

III. Research and Development Laboratories - Grand Island

Hooker's research facility on Grand Island was opened in January 1959. Prior to the opening of this site, the research facilities were located at the Niagara Falls plant. The wastes generated from the research facility consists of miscellaneous laboratory chemicals including acids, alkalies, organic compounds, oxidizing agents and pesticides (pentac, lindane, thiodan, etc.). These wastes have been disposed of as follows:

1. From January 1959 to 1962, waste chemicals (bottles, jars and vials packed in drums) from Grand Island were picked up and disposed of in the S and N area landfill sites or at the Hyde Park site.

2. From 1962 to mid-1973, refuse and combustible waste chemicals from Grand Island were incinerated at the Grand Island location, while noncombustible waste chemicals (bottles, jars and vials packed in drums) were disposed of in the S and N areas and the Hyde Park landfill.

3. From May 1973 to 1975, the Research and Development facility on Grand Island contracted with Chem-Trol for disposal of chemical wastes (including small containers of miscellaneous chemicals packed in drums) at the Chem-Trol site in Porter.

The following waste chemicals were disposed of at Porter:

Unidentified packaged laboratory chemicals	109 drums
Copper bath and rinse solution	10 drums
Methylene chloride	12 drums
Cyclohexanone	5 drums
Mineral spirits	4 drums
Acetone	7 drums
Combined organic laboratory solvents	49 drums

Total Approximately 20 tons

4. Since 1976, similar laboratory chemicals to those have been disposed of at Newco in Niagara Falls.

5. In addition, plastic wastes from the polymer synthesis facility constructed on Grand Island in 1970, such as polyvinyl chloride, amounting to approximately 80 drums per year have been disposed of at Hyde Park and the S and N areas (1970 to 1973), Chem-Trol in Porter (1973 to 1975) and Newco (since 1976).

Hooker has indicated that no wastes from the Grand Island facility were land disposed on Grand Island.

INTERNATIONAL MINERALS AND CHEMICAL CORPORATION
4626 Royal Avenue
Niagara Falls

IMC was incorporated in New York in 1909 as the International Agriculture Corporation. In 1951, IMC acquired Interspieden and Company (ISCO) in Niagara Falls. Operations ceased in 1972 and the plant was sold to Niagara Recycling in 1974.

From 1951 to 1972, IMC manufactured chlorine, caustic potash, potassium carbonate and chloropicrin using electrolytic diaphragm cells, crystallization and calcination and chlorination of nitromethane to chloropicrin. Prior to 1951, ISCO produced similar products at the plant by the same processes.

IMC's Location Manager indicated to the Task Force that no records of the nature, quantities or disposal of waste materials generated by IMC exist.

From 1969 to the present, NRD has used powder metallurgy to manufacture sealed foil radioactive sources for use in devices such as smoke detectors.

Both liquid and solid radioactive waste result from the above process. From 1969 through 1976, an evaporator was used for some of the liquid waste. Normally, liquid waste is released to the sanitary sewer following analysis for radioactive levels. Solid wastes include Americium-241, Nickel-63, Lead-210, Radium-226, Thallium-203, Cesium-137, Strontium-90, Krypton-85 and Carbon-14. All solid wastes (including filter particulates from water treatment) is packaged into steel drums and shipped to the nearest available disposal site. Three sites have been used for waste generated at NRD: Four shipments were sent to Nuclear Fuel Services in West Valley, New York from 1970 to 1972. Since 1972, three shipments have gone to the Nuclear Engineering Company in Morehead, Kentucky and 14 shipments were sent to Chem-Nuclear Systems, Inc. in Barnwell, South Carolina. The average shipment consists of approximately 94 steel drums and five wooden and/or cardboard boxes. Solid waste is generated at the rate of 28 tons per year. Waste haulers include:

1. McCormack Highway Transportation, Inc., Campbell Road, Schenectady, New York
2. Tristate Motor Transit Company
3. Pacific Intermountain Express
4. Rented Ryder Trucks (by NRD for West Valley deliveries)

OLIN CORPORATION
Buffalo Avenue
Niagara Falls

Olin began operations at the Buffalo Avenue facility in 1897 under the name of Castner Electrolytic Company. Since that time, the company has also been known as Mathieson Chemical Company, Olin Mathieson Chemical Corporation and Olin Corporation.

Olin has produced the following products:

Ammonia	(No data)
Chlorine	(Since 1930)
HTH (calcium hypochlorite)	(Since 1927)
Hydrochloric acid	(1953 to 1956)
Hexachlorocyclohexane (C-66)	(1950 to 1956)
Sodium chlorite	(Since 1941)
Sodium hydroxide	(Since 1930)
Sodium methylate	(Since 1941)
Trichlorobenzene	(1952 to 1956)
Trichlorophenol	(1953 to 1957)

Numerous productions processes have been used since 1930. These are generally the standard unit operations and processes used by the chemical process industries. Among the processes used are brine electrolysis, triple salt process, sodium amalgam process, reduction of chlorine dioxide, chlorinations and other chemical reactions.

Olin has generated the following types of industrial wastes:

Black cake (sodium chloride, sodium chlorite, sodium chlorate, carbon, calcium carbonate and calcium hydroxide)
Graphite
Fly ash
Benzene hexachloride
Trichlorophenol
Trichlorobenzene
Alpha or Beta BHC cake
v-Tetrachlorobenzene
Carbon dust
Hexachlorobenzene
Pentachloronitrobenzene
Lime sludge
Brine sludge containing mercury
Retort ash
Trichloroanisole
Miscellaneous industrial wastes (concrete, old insulation and empty containers)

Many disposal sites were used for disposal of industrial wastes. These sites are described below. Also, Olin is in the process of obtaining additional information about the company owned sites. This material is to be submitted to the Task Force shortly.

A. Company Owned Sites

1. 102nd Street (Buffalo Avenue, Niagara Falls)

The 102nd Street landfill was purchased in 1948 and used for disposal of various industrial wastes until 1970. The site, comprising about seven acres, is still owned by Olin today. The following types of industrial wastes were disposed of at this site:

Waste	Estimated Total Tonnage
"Black cake"	20,000
Graphite	692
Benzene hexachloride and trichlorophenol mixture	65
Trichlorobenzene	150
Alpha and Beta BHC cake	1,250

v-Tetrachlorobenzene	1,100
Lime sludge	23,900
Brine sludge	20,000
Hexachlorobenzene	60
Trichloroanisole	No data
TOTAL Approximately	66,000 tons

In addition, over 16,000 tons of concrete, empty containers, fly ash, boiler ash, and trash were disposed of at this site.

Wastes were dumped in bulk or in drums as solids, semi-solids or liquids. The material was placed in pits which were eventually covered or deposited directly onto the ground.

2. Buffalo Avenue Parking Lot

This site was used from approximately 1947 to 1956 to dispose of about 175 tons of brine sludge containing mercury.

3. Industrial Welding Company Site

Olin previously owned this site and used it from 1947 to approximately 1956 to dispose of about 175 tons of brine sludge containing mercury.

4. Miscellaneous On-Plant Disposal Sites

At least one other plant site was used from about 1957 to 1960 to dispose of about 275 tons of brine sludge containing mercury.

B. Off-Plant Waste Disposal Sites

1. Niagara County Refuse Disposal District (Wheatfield)

Olin used this site from about 1961 to 1976 to dispose of approximately 32 tons of graphite, about 1000 tons of lime sludge (1970 to 1972) and 4964 tons of brine sludge containing mercury (1971 only). J. Vitullo Trucking Company of Niagara Falls transported these materials in bulk quantity to this site.

2. Newco Waste Systems (Niagara Falls)

This site has been used since 1972 to dispose of graphite, lime sludge and brine sludge containing mercury. 1.8 tons of graphite (1977 only); 3,444 tons of lime sludge (since 1972); and 21,900 tons of brine sludge (1972 to 1977) were hauled by J. Vitullo in bulk quantity to the Niagara Recycling operation for disposal. In addition, since 1978, J. Vitullo has hauled 3,348 tons of brine sludge to Newco for disposal in their secure landfill. Furthermore, in 1978, several other haulers were used to transport industrial wastes to Newco.

Lorber Truck Service of Kenmore hauled secondary treatment sludge, sodium methylate, filter residue, caustic backwash, filter tubes and caustic, packaging, retort ash containing mercury and contaminated soil. Cataract Disposal of Niagara Falls hauled chlorate sludge and secondary treatment sludge. Walter S. Kozdranski, Niagara Falls, Sicoli and Massaro, Thomas Carter Trucking, and Johnson (addresses unknown) transported contaminated soil. Finally, C.H. Heist Corporation of Cheektowaga and Wizard Method of Niagara Falls hauled sludge from cleaning sewers. The quantities hauled by the above contractors are not known.

3. Air Force Plant No. 68 (Model City)

This facility was operated by Olin from approximately 1958 to 1960 under contract with the Air Force and Navy to perform work on high energy fuel projects. Since 1966, this area has been owned by Fort Conti Corporation.

The waste generated consisted of boron and lithium compounds and were disposed of in two sites on the facility property. The types of wastes disposed are listed below:

a. Site No. 1

Waste	Estimated Total Tonnage
Lithium chloride	13
Potassium chloride	14.6
Lithium chloride contaminated with kerosene, oil, process residuals and decontaminated solutions	8
Unknown chemical wastes	30
Total Approximately	70 Tons

The total quantity of wastes buried is estimated to be approximately 300 drums.

b. Site No. 2

This consisted of waste burning pits used for the disposal of an unknown quantity of off-specification borane compounds and other combustible wastes. The residue remaining in these pits was covered with earth when the operation ceased.

C. Miscellaneous Waste Disposal Activities

Olin has indicated to the Task Force that since 1930, the Niagara Falls plant made available to various persons (their identity is not known) brine sludges, fly ash, broken concrete, building materials and salt dirt for use as driveway bases or

fill. These waste materials, in some cases, were contaminated or mixed with miscellaneous organic compounds generated at the company's research facility. However, the exact nature or quantities of these materials cannot be determined.

PENNWALT CORPORATION
Lucidol Division
1740 Military Road
Buffalo

This company began operations in Buffalo in 1926 as Novadel-Agene Corporation. It became the Lucidol Division of Wallace & Tiernan in 1953. It is now known as the Lucidol Division of Pennwalt Corporation.

Products include lauroyl peroxide, dicyclohexyl peroxy dicarbonate, foot powder, baby powder and vitamin enrichments.

From 1956 to 1970, phosphorous acid sludge was neutralized with limestone and land disposed on the southeast portion of plant property. Since 1970, the sludge, in amounts of 12.5 tons per year, has been converted to 70% phosphorous acid and sold. It is no longer land disposed.

Other wastes have been stored on-site in polyethylene lined steel drums until removal by SCA Chemical Waste Service, Newco Chemical Waste Systems and/or Frontier Chemical Waste Process for drummed disposal. In addition, from 1976 to 1978, lauroyl peroxide sludge was taken by Davis Scrap Service of Buffalo to the Seaway Industrial Park.

PIERCE & STEVENS
710 Ohio Street
Buffalo

Pierce & Stevens was incorporated in New York in 1917 and began operations in Buffalo in that year. In 1967, it was acquired by Pratt & Lambert. Since 1930, the company has manufactured coatings, adhesives and thinners.

Waste materials generated at the plant include scrap metals, miscellaneous paper and wood and waste liquids, (adhesives, paint and lacquer solvents such as hydrocarbons, ketones, esters and alcohols).